FIG.1

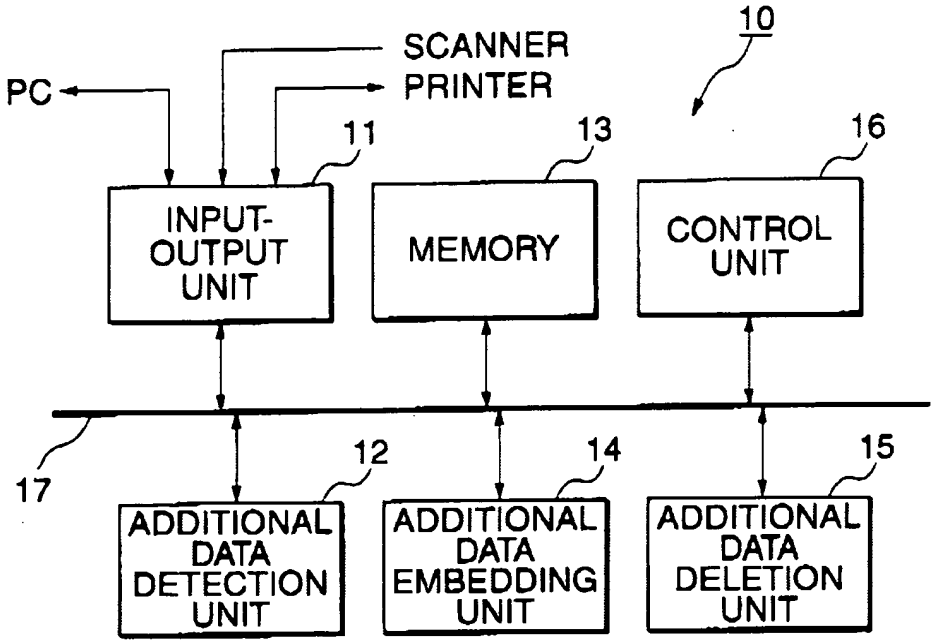
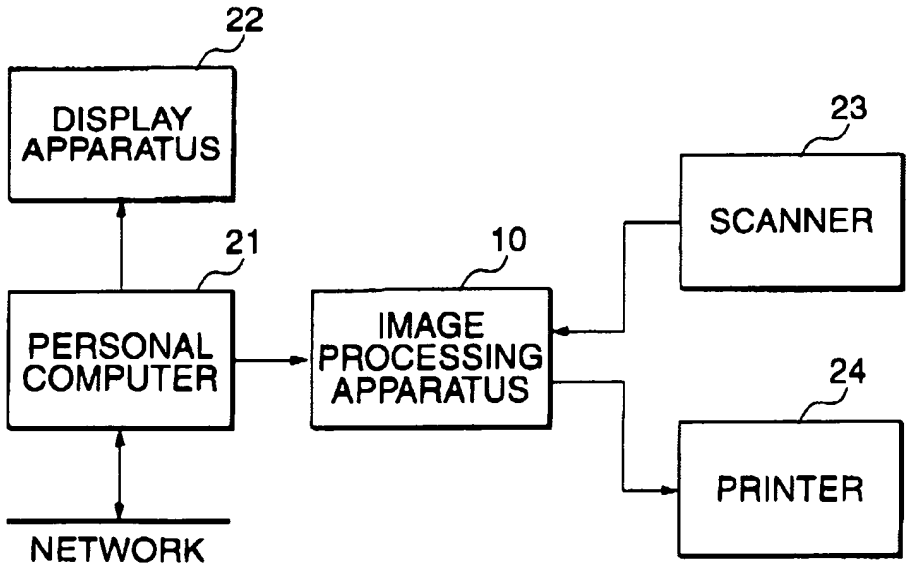

10
SCANNER
PRINTER
PC
11
13
16
INPUT-OUTPUT UNIT
MEMORY
CONTROL UNIT
17
12
14
15
ADDITIONAL DATA DETECTION UNIT
ADDITIONAL DATA EMBEDDING UNIT
ADDITIONAL DATA DELETION UNIT

FIG.2


22
DISPLAY APPARATUS
23
SCANNER
21
10
PERSONAL COMPUTER
IMAGE PROCESSING APPARATUS
24
PRINTER
NETWORK

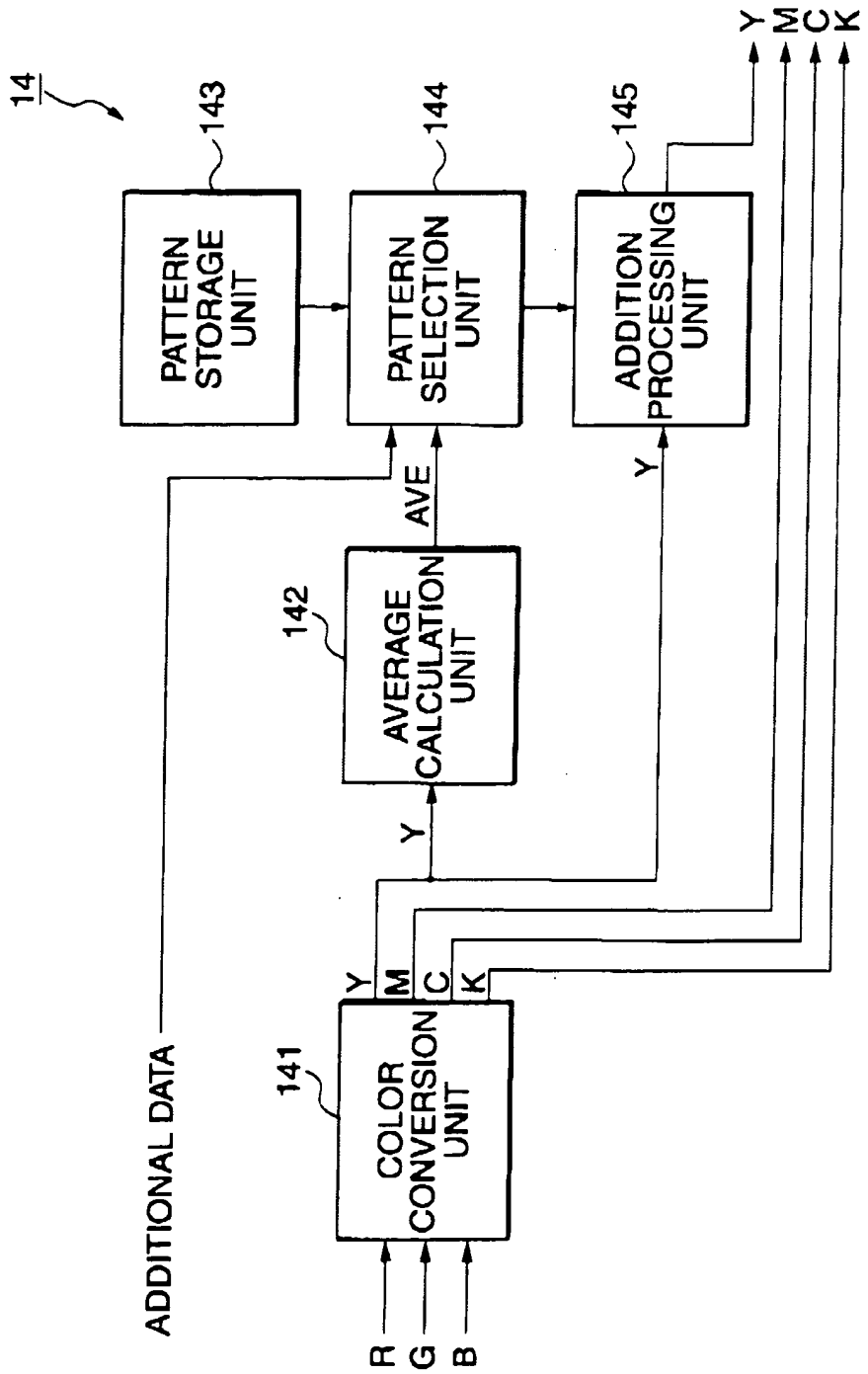

14
143
144
145
PATTERN STORAGE UNIT
PATTERN SELECTION UNIT
ADDITION PROCESSING UNIT
Y M C K
AVE
Y
142
AVERAGE CALCULATION UNIT
Y
Y M C K
141
COLOR CONVERSION UNIT
ADDITIONAL DATA
R G B

FIG.3

FIG.4

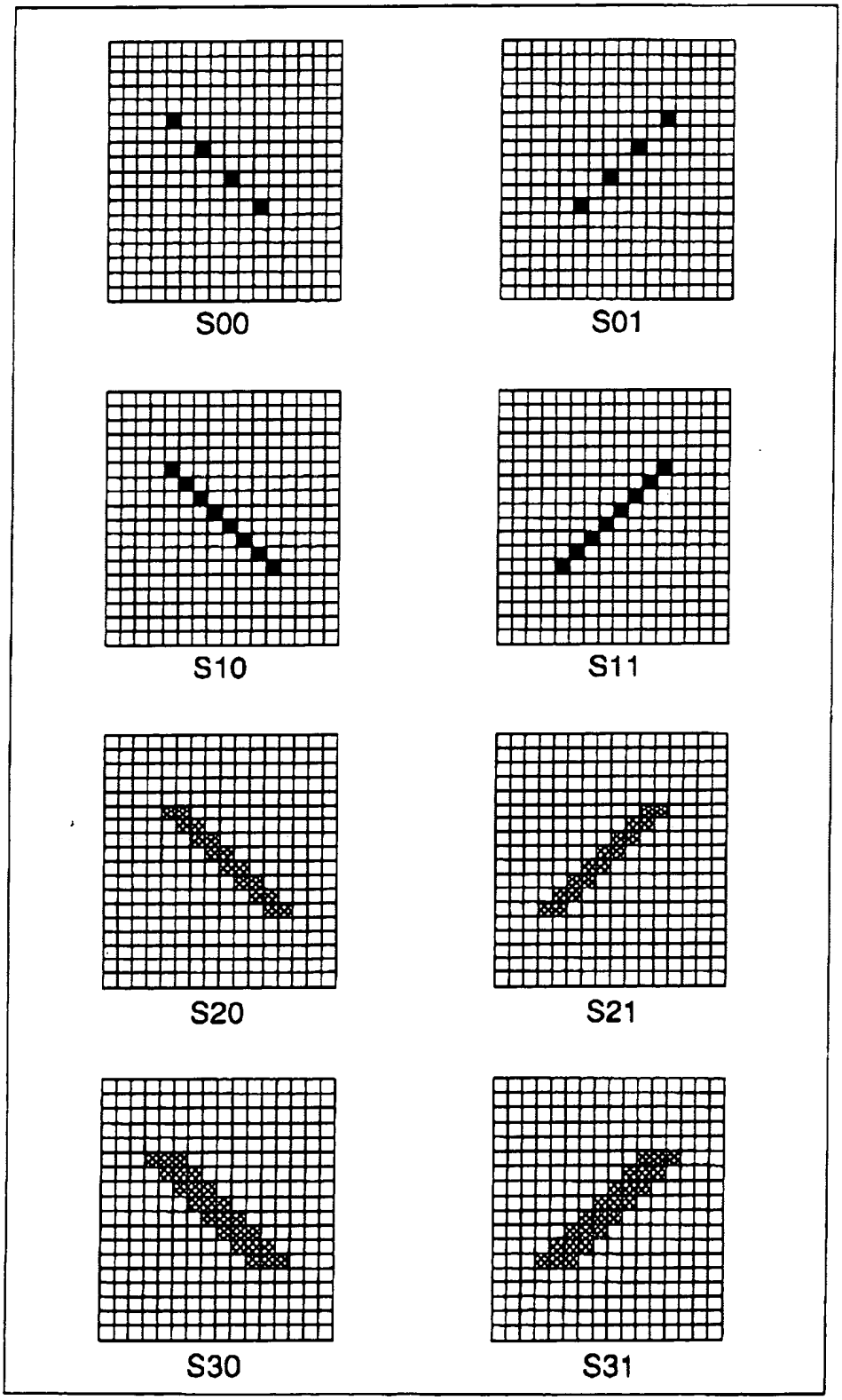
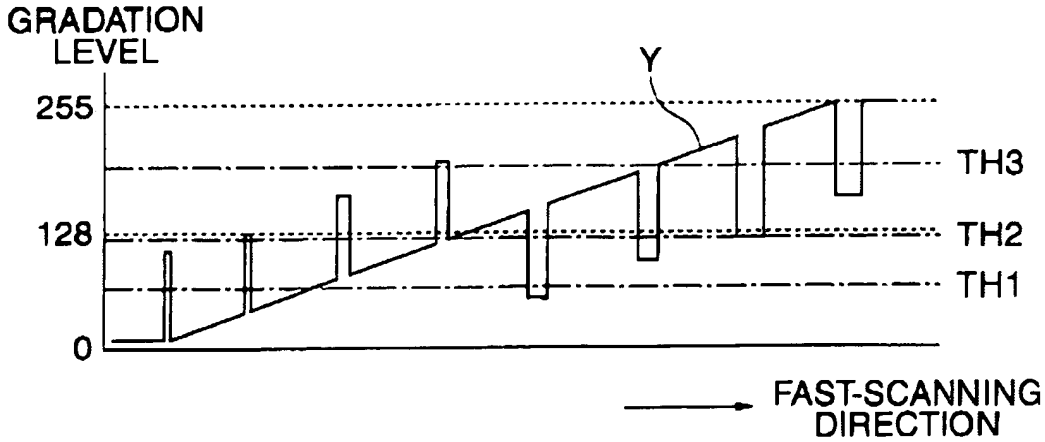


FIG.5

AVERAGE AVE	ADDITIONAL DATA BIT	PATTERN SELECTED
AVE ≦ TH1	0	S00
	1	S01
TH1 < AVE ≦ TH2	0	S10
	1	S11
TH2 < AVE ≦ TH3	0	S20
	1	S21
TH3 < AVE	0	S30
	1	S31

FIG.6



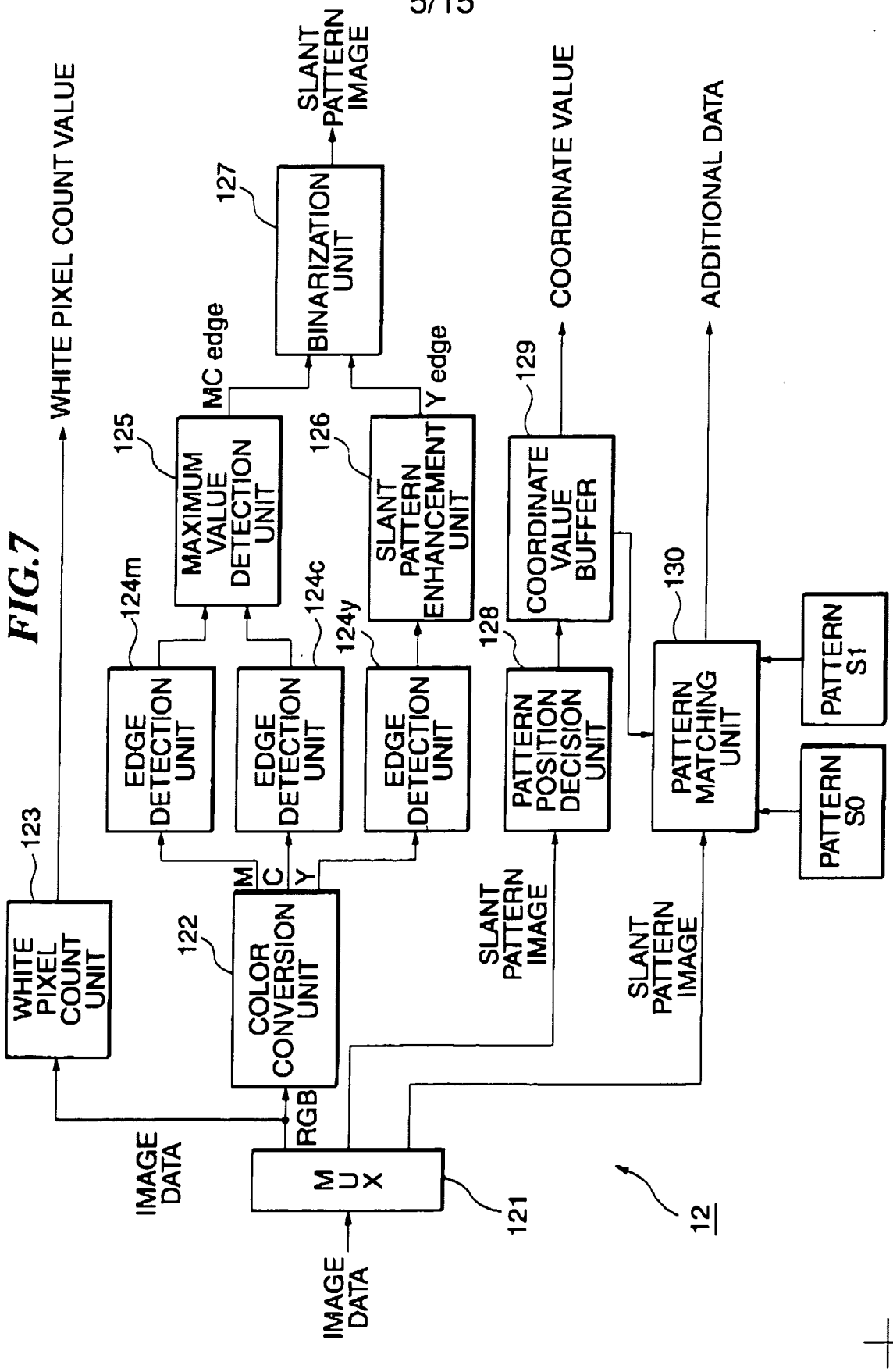


IMAGE DATA
MUX
121
12
RGB
IMAGE DATA
WHITE PIXEL COUNT UNIT
123
WHITE PIXEL COUNT VALUE
COLOR CONVERSION UNIT
122
M
C
Y
EDGE DETECTION UNIT
124m
EDGE DETECTION UNIT
124c
EDGE DETECTION UNIT
124y
MAXIMUM VALUE DETECTION UNIT
125
SLANT PATTERN ENHANCEMENT UNIT
126
MC edge
Y edge
BINARIZATION UNIT
127
SLANT PATTERN IMAGE
PATTERN POSITION DECISION UNIT
128
COORDINATE VALUE BUFFER
129
COORDINATE VALUE
PATTERN MATCHING UNIT
130
ADDITIONAL DATA
SLANT PATTERN IMAGE
SLANT PATTERN IMAGE
PATTERN S1
PATTERN S0

FIG.7

FIG.8A

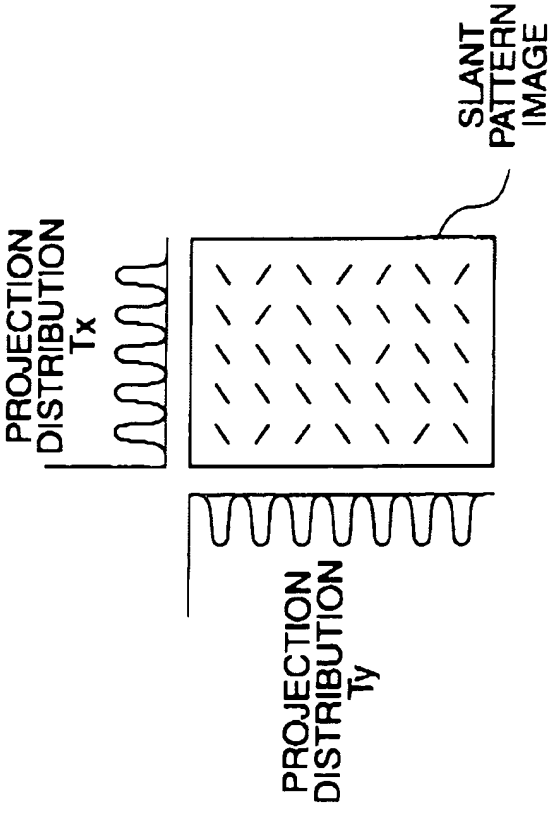


FIG.8B

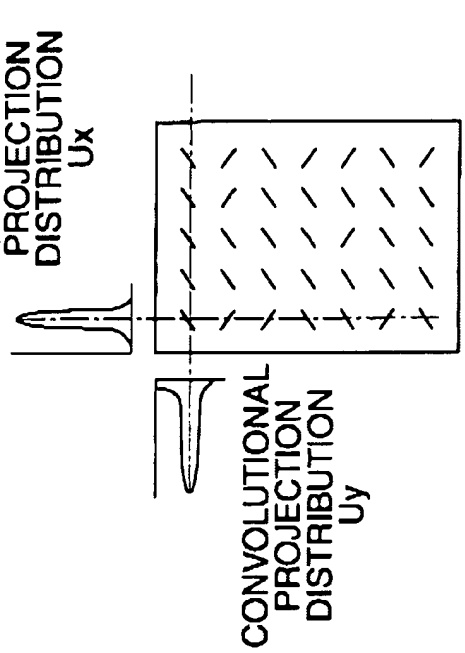


FIG.8C

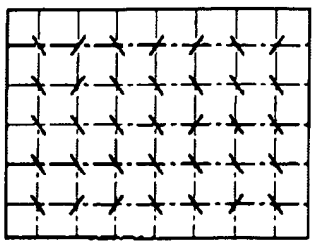
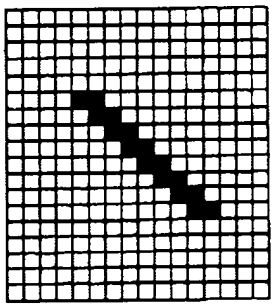
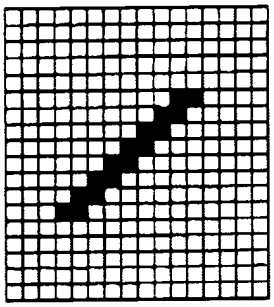


FIG.9A



S0

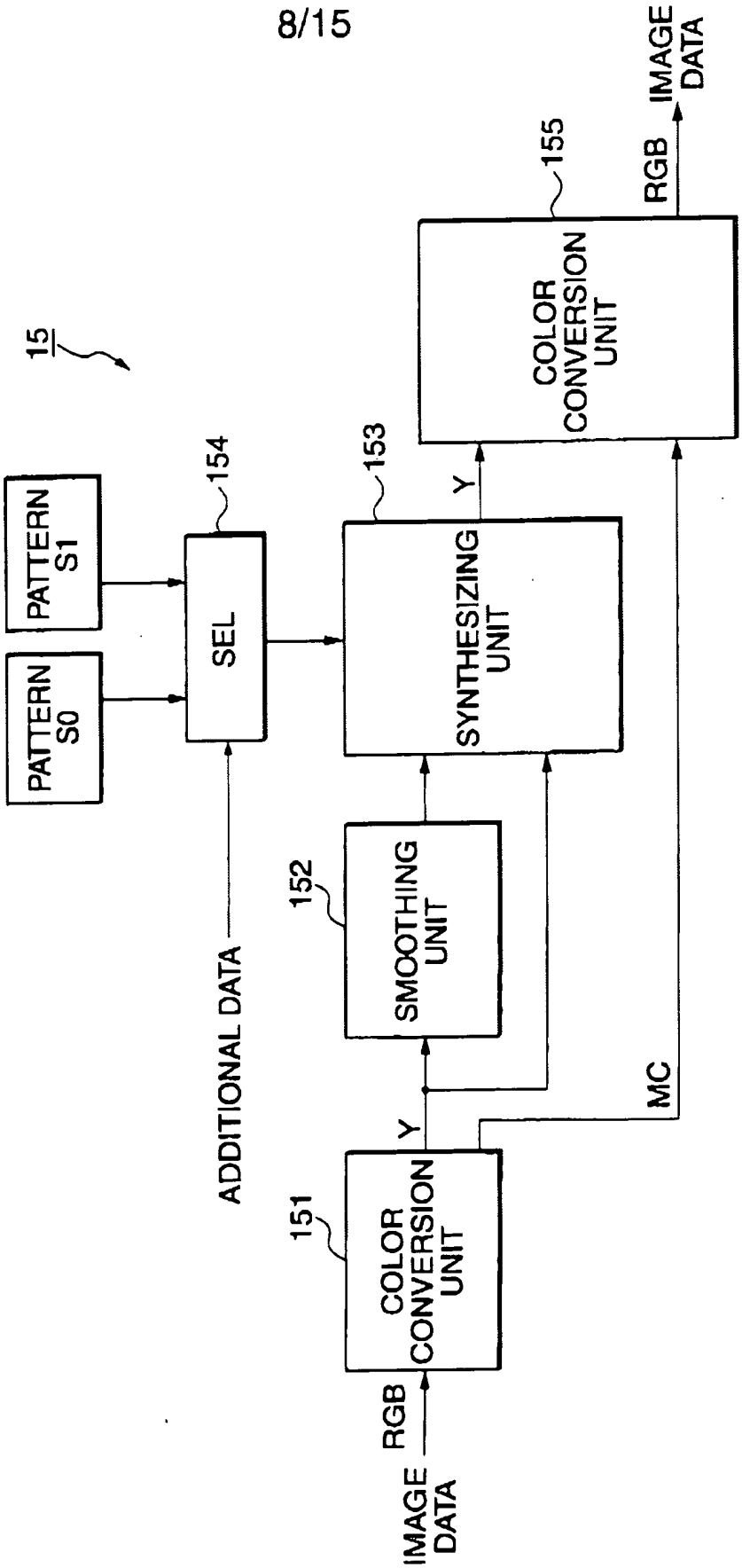
FIG.9B



S1

0505050.000000

FIG.10


15
IMAGE DATA
RGB
151
COLOR CONVERSION UNIT
Y
MC
152
SMOOTHING UNIT
ADDITIONAL DATA
154
SEL
PATTERN S0
PATTERN S1
153
SYNTHESIZING UNIT
Y
155
COLOR CONVERSION UNIT
RGB
IMAGE DATA

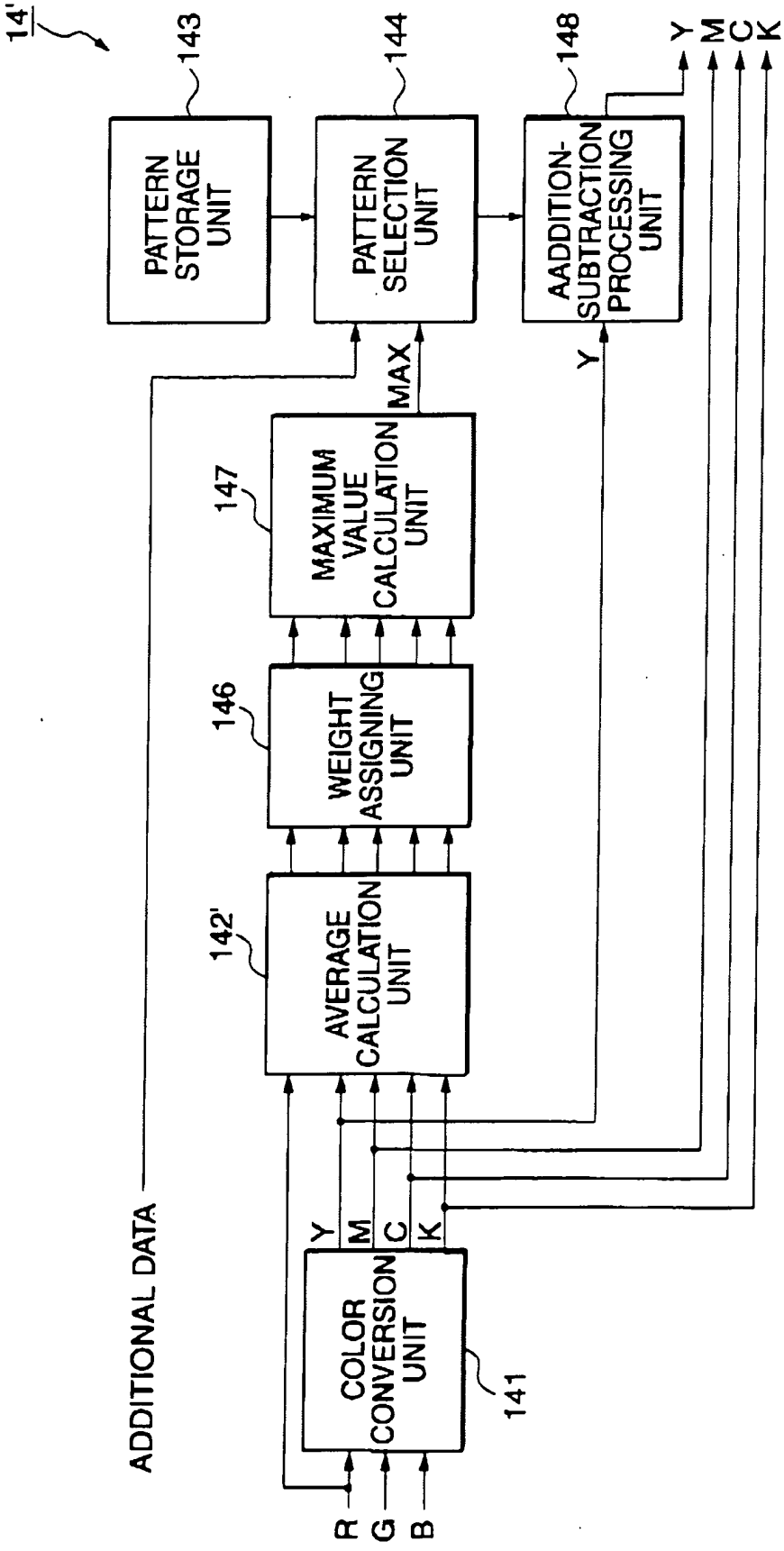

14'
143
144
148
PATTERN STORAGE UNIT
PATTERN SELECTION UNIT
AADDITION-SUBTRACTION PROCESSING UNIT
Y
M
C
K
MAX
147
MAXIMUM VALUE CALCULATION UNIT
146
WEIGHT ASSIGNING UNIT
142'
AVERAGE CALCULATION UNIT
ADDITIONAL DATA
COLOR CONVERSION UNIT
141
R
G
B

FIG.11

FIG.12

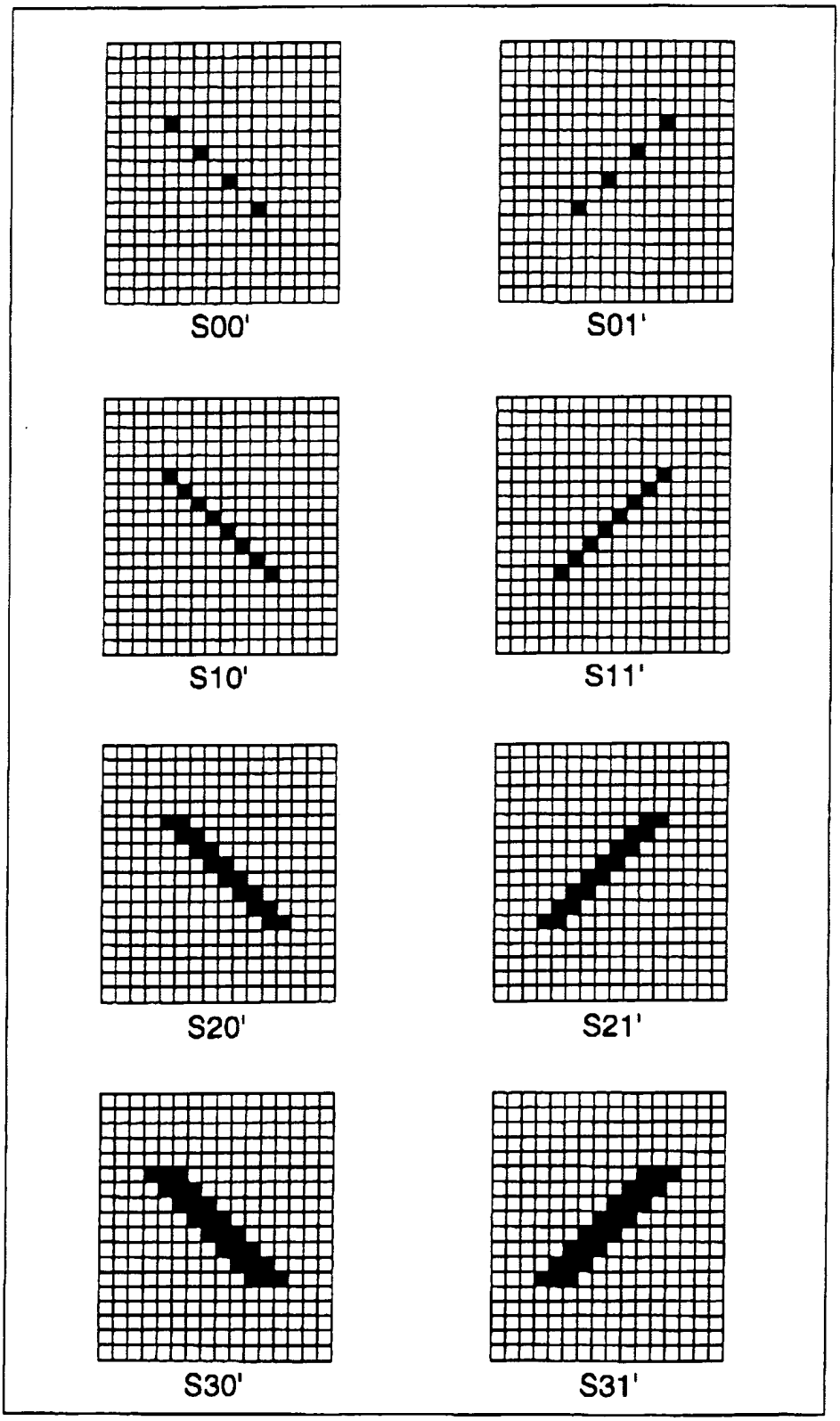


FIG.13

MAXIMUM MAX	ADDITIONAL DATA BIT	PATTERN SELECTED
MAX ≦ TH1	0	S00'
	1	S01'
TH1 < MAX ≦ TH2	0	S10'
	1	S11'
TH2 < MAX ≦ TH3	0	S20'
	1	S21'
TH3 < MAX	0	S30'
	1	S31'

0000000000

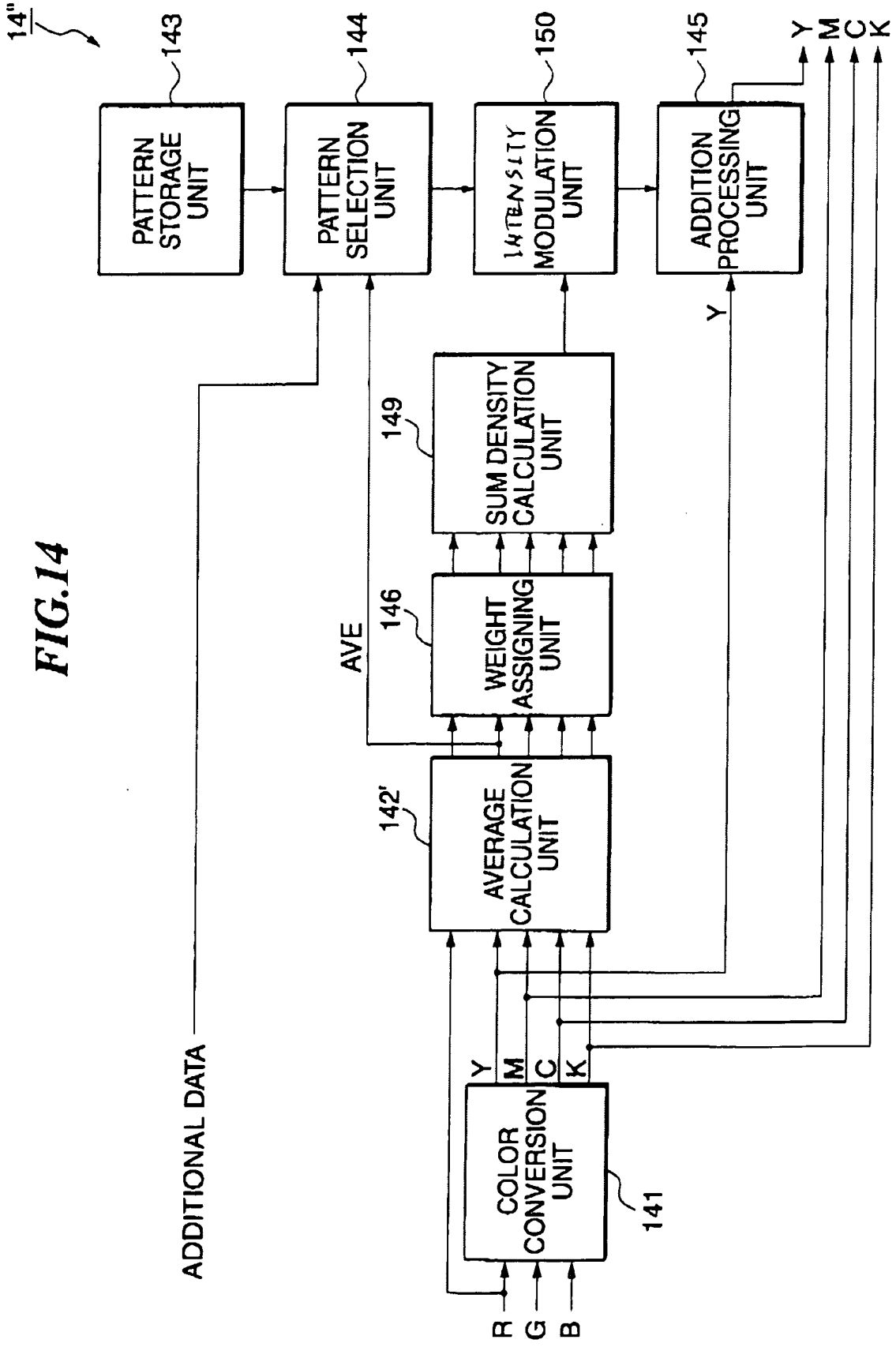

14"
143
PATTERN STORAGE UNIT
144
PATTERN SELECTION UNIT
150
INTENSITY MODULATION UNIT
145
ADDITION PROCESSING UNIT
Y
M
C
K
149
SUM DENSITY CALCULATION UNIT
146
WEIGHT ASSIGNING UNIT
AVE
142'
AVERAGE CALCULATION UNIT
ADDITIONAL DATA
COLOR CONVERSION UNIT
141
R
G
B

FIG.14

FIG.15

AVERAGE AVE	ADDITIONAL DATA BIT	PATTERN SELECTED
AVE ≦ TH1	0	S00
	1	S01
TH1 < AVE ≦ TH2	0	S10
	1	S11
TH2 < AVE ≦ TH3	0	S20
	1	S21
TH3 < AVE	0	S30
	1	S31

0950050-080000

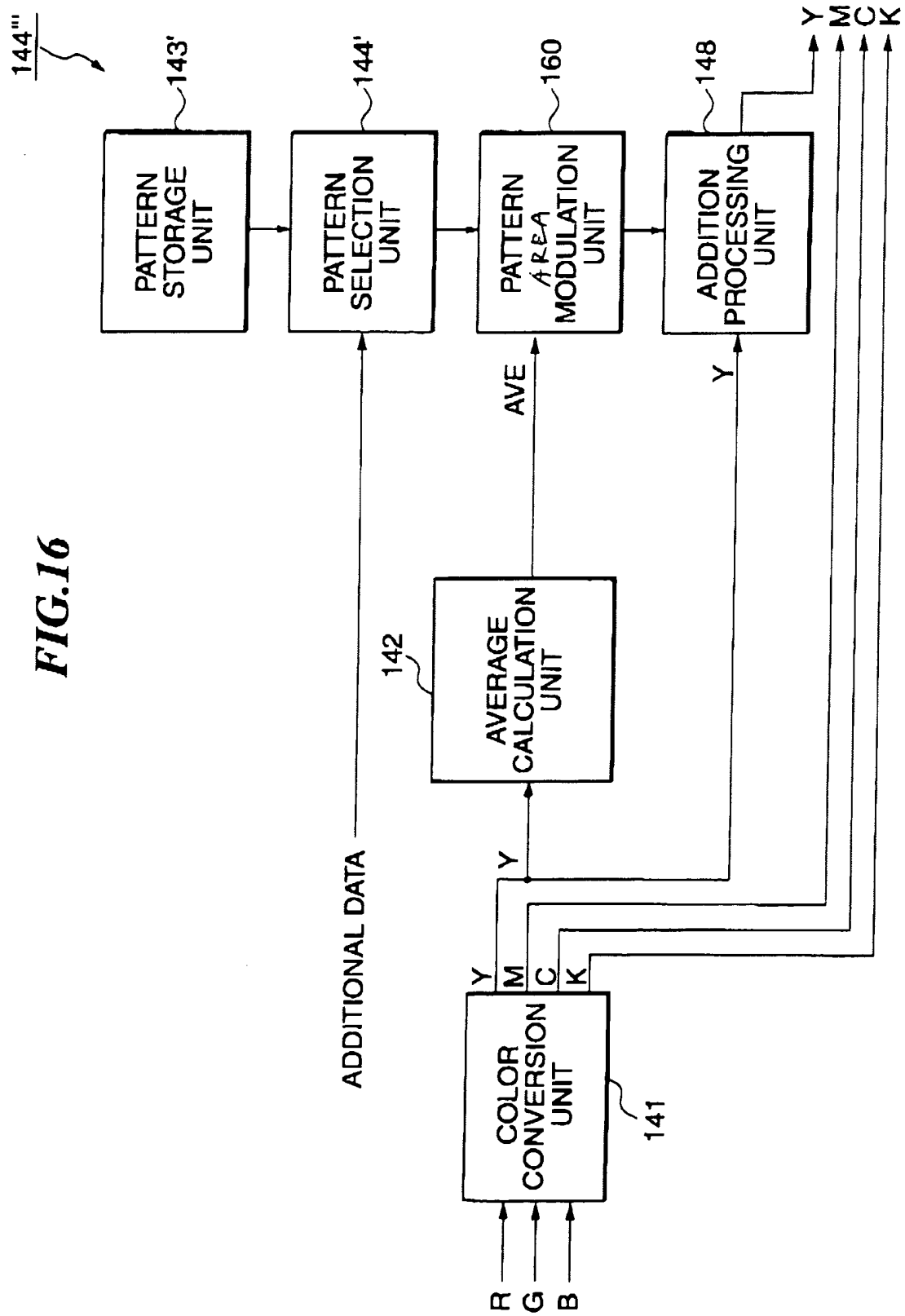

144'''
143'
PATTERN STORAGE UNIT
144'
PATTERN SELECTION UNIT
160
PATTERN AREA MODULATION UNIT
148
ADDITION PROCESSING UNIT
Y
M
C
K
AVE
Y
142
AVERAGE CALCULATION UNIT
ADDITIONAL DATA
Y
Y
M
C
K
COLOR CONVERSION UNIT
141
R
G
B

FIG.16

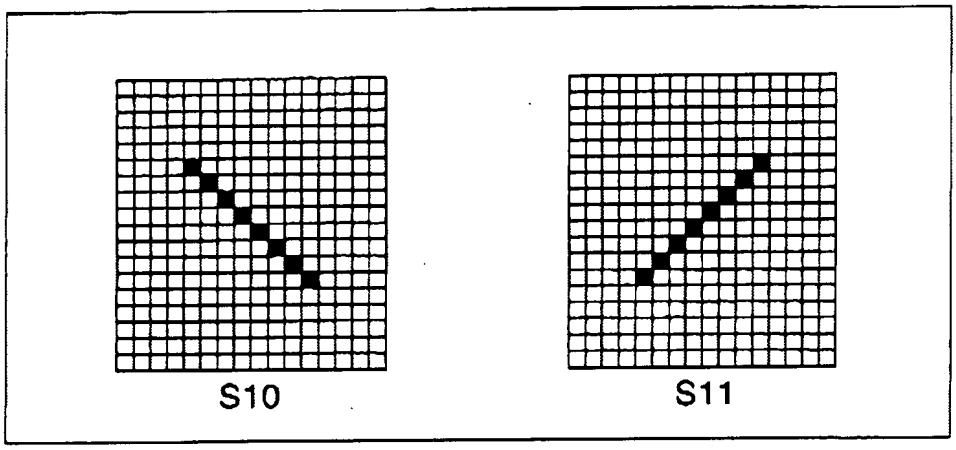



FIG.17